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SCOTT POLAR RESEARCH INSTITUTE

OCCASIONAL PAPER No. 1

The Organization of Polar Information

By

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THE ORGANIZATION OF POLAR INFORMATION*

By

BRIAN ROBERTS

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* This paper has been prepared in response to suggestions made at a meeting of representatives of polar institutes organized by Arktisk Institut, København, on 21 August 1960.

The high cost of printing, which might have been expected to limit this flood of information, has instead stimulated new and cheaper methods of reproduction. Reports issued in one or other of the various kinds of near-print are satisfactory as a quick means of disseminating preliminary results or for work of no more than ephemeral interest, but they are not an adequate substitute for the more traditional forms of publication in monographs or recognized scientific serials. Sometimes only a few are distributed, and copies cannot be acquired without great effort. They are often headed "preliminary report", but no subsequent version appears. They do not provide a permanent record available through normal library channels. Furthermore, the relatively low cost compared with normal printing has too frequently allowed authors and editors to run riot. A large proportion of these reports would benefit by the most drastic cutting and editing. There is no evidence that people are reading more than in past years; yet the number of publications is increasing by more than 10 per cent a year.

Many research organizations now make a practice of distributing advance abstracts and progress reports which anticipate and extensively duplicate the final comprehensive publication. This is useful in subjects of immediate importance, but in most cases it becomes an encumbrance on the information services. No one has the time to wade through the welter of paper disguising some trivial discovery under a multiplicity of different titles. Original results should normally be published in full once and once only.

Today it is a wholly irrational goal for librarians to attempt the comprehensive collection of *all* the available records dealing with their subject. It is more important that any significant, specified document or publication can be produced as quickly as possible on request. Decentralization is essential. The problems can be met in part with the aid of efficient catalogues and union lists of library holdings, by increasing use of photographic reproduction techniques, and by more or less formal agreements among librarians as to responsibility for acquisition and cataloguing in specified subject fields. Abstracting services must also play an increasing part.

Cataloguing

Cataloguing, as distinct from classification, is the identification of documents by their author, title and physical nature. In the SPRI, catalogue entries for each document are made on standard cards; duplicated so that one (or more, if necessary) can be placed in an alphabetical author index, while the necessary number of additional copies are placed in indexes classified by subject and region. These cards are arranged in the sequence of the classification discussed in the next section. The physical placing of the documents themselves is indicated on the cards. While a document can only be placed in a single place on the shelves or in the files, it can be traced either from its author(s) or from the subject(s) or region(s) which are being investigated.

Co-operative cataloguing involves a number of people and consequently clear definition of the field to be covered by each in order to avoid duplication of work. It is irrational that many people in different organizations and countries should all be doing the same job again and again when in fact it only needs to be done once. What is needed is an agreed machinery to produce the number of bibliographic cards required for our purposes. Often the final result can only be achieved by the co-operation of not less than three people —one with knowledge of language, one of subject matter, and one of bibliographic technique. We should work towards the position where bibliographic cards or abstracts made by any one of a number of co-operating organizations can be automatically incorporated into the collections of any of the others. When bibliographic cards are prepared, they should, if possible, be classified by an agreed system which falls into its proper place in the sequence of the subject catalogues maintained by all those collaborating.

At an early stage, it was necessary for the SPRI to decide on a system of cataloguing. After considerable experiment, the rules of the American Library Association (1948), commonly known as the "Anglo-American Joint Code", were selected. This code was devised primarily for ordinary books and periodicals. It has defects for the special report series which are a common method of publishing the results of polar expeditions, and it provides no guide for some recurring problems in specialist polar libraries. A supplementary document was therefore prepared to cover these special cases (SPRI, 1950). Copies of this can be obtained on request.

Subject classification

The correct classification of a work is a specialist's job, but the physical arrangement and finding must be a simple process which can be done by anyone.

Every writer or research worker who has been called upon to deal with any considerable body of documents (whether from the point of view of their arrangement or from that of their use) has invariably found it necessary to construct some scheme of classification for his own purposes. It would obviously be to the advantage of all if a single one could win general agreement.

Classification can become a powerful tool for the organization and analysis of recorded information. The better the classification, the less time is wasted searching. It is essential to classify into fairly small subdivisions or there is too lengthy a search among the items classed under larger divisions. In any classification system it is necessary to choose between skilled classification and rapid finding by an unskilled searcher, or *vice versa*. Most of the time delays are due not to the complexities of the classification system, but to the difficulty in deciding what a document is about.

The SPRI experimented with various systems of classification between 1932 and 1945. Consideration of existing systems gave a first impression that none of them was really suited to our purpose; that it might be best to construct a new one specially for polar research organizations. There were, however, four main objections:

(1) Any successful classification must be alive and growing and changing continually under revision, extension and replacement. A new classification could only remain new for a short time, and then all the same problems must again arise as for existing classifications.

(2) Despite their imperfections, existing classifications have proved effective in a great many special libraries.

(3) Generations of experts have worked and are still working on their improvement, and it is folly not to profit from their work.

(4) There are notable advantages in being linked to a classification which is widely used and has international authority.

The next problem was to decide which of the existing classifications to select. This question is treated in many books, of which the manual by Sayers (1947) can be particularly recommended. After three years of trial and experiment it was finally decided that the Universal Decimal Classification offered more advantages than any other. The UDC was first advocated for polar bibliographies by Otlet (1906), and it was adopted by Lecointe (1907) for organizing the archives of the Institut Polaire International at Bruxelles, and by Denucé (1913) for his Antarctic bibliography. Between 1913 and 1945 the UDC had, of course, made tremendous advances. Fifteen years of experience of the UDC have since confirmed that it provides the best solution so far proposed.

The history of this classification, its availability, organization for development and revision, principles, structure and notation, and general notes on its use, are set out in the foreword to the latest English abridgement (British Standards Institution, 1957).

The first step was to make an abstract in English of all the items considered relevant in the latest English, French, German and Dutch editions of the schedules of the UDC issued by national authorities under the auspices of the Fédération Internationale de Documentation (FID). After the discrepancies had been resolved with the help of the British Standards Institution, working in co-operation with FID, this abstract (Roberts, 1950) was made available in mimeographed form, and was subsequently amended and enlarged in eight supplements issued between 1950 and 1956. At an early stage it had been recognized that certain sections of the existing schedules would need major revision, especially those relating to snow, ice and frozen ground, frozen ground engineering, snow and ice engineering, ski-ing equipment, ships for use in ice; and the whole problem of regional classification (see p. 6). This revision and extension was achieved between 1950 and 1956; the glaciological subjects in close co-operation with the British Glaciological Society, which has throughout been associated with the SPRI in a co-operative scheme for the cumulative card catalogues maintained by both organizations and the serial lists of current publications in each issue of the *Polar Record* and the *Journal of Glaciology*. By 1956 it was possible to issue a new edition (Roberts, 1956) incorporating all these improvements. This was far less parochial in outlook than the 1950 edition; the change in title recognized that polar libraries in other countries were finding it useful. The delays were due partly to the slow accumulation of practical experience, but much more to the necessity for achieving international agreement through the machinery of FID. Let no one lightheartedly underestimate the difficulties of reaching international agreement on such matters. But it can be done if one thinks in terms of years rather than months!

Classification is an art, requiring knowledge of the schedules themselves, and, above all, of the subject to be classified. The aim is not to specify the contents of a particular document, but to be able to produce the relevant documents, from whatever source they may have come, and by whoever they may have been classified.

The UDC is designed for use in the collection and dissemination of information on any subject. All bibliographies classified by this system can be amalgamated into a single catalogue, irrespective of source or language. Such a comprehensive catalogue can only be achieved by the co-operation of many bibliographers in many countries.

One of the most obvious methods of co-operation consists in aggregating the various relevant literature lists that are produced. Thus, all polar organizations using the UDC can exchange bibliographic cards and build up their own card indexes by cumulating references issued from many sources at different times. The references so collected fall together by subject, where they can be found immediately, thus eliminating the time wasted in searching numerous unco-ordinated volumes of bibliography which may be arranged by different systems.

Many published bibliographies are now classified by the UDC and are issued, either in the form of cards, or in units adapted to mounting on cards for the purpose of successive cumulation. As the scheme for co-operative cataloguing on the basis of the UDC gathers adherents, the cost of compilation and the difficulties of language and specialized knowledge should be substantially reduced.

The UDC is now used by many organizations which publish serial literature lists; we may mention particularly the abstracts of the institutions associated with the World Meteorological Organization (e.g. *Meteorological Abstracts and Bibliography* issued by the American Meteorological Society since 1950), and the accessions lists of the British Meteorological Office; also *Physics Abstracts*, and *World Fisheries Abstracts*. The same system is used in the periodical accessions lists issued by the Science Museum Library and the British Museum (Natural History) in London. When we come to organizations more specifically concerned with polar studies, it has been encouraging to note the adoption of the UDC by such organizations as the Antarctic Division of the Australian Department of External Affairs in Melbourne, the Archiv für Polarforschung in Kiel, the Arctic and Antarctic Research Institute [Arkticheskiy i Antarkticheskiy Nauchno-Issledovatel'skiy Institut] in Leningrad,* the British Glaciological Society, the Department of Northern Affairs in Ottawa, the Division of Building Research of the National Research Council of Canada in Ottawa, Expéditions Polaires Françaises in Paris, the I.G.Y. World Data Centres for Glaciology in New York and Cambridge, and the Snow, Ice and Permafrost Research Establishment. The last of these has performed a particularly valuable service by issuing their abstracts both in periodical volumes, and also separately (and earlier) on cards which, since 1958, have been classified by UDC in addition to the word headings which they originally employed.

Subject catalogues all too often deal with the phraseology of titles instead of the real subject-matter. A single word is rarely suitable to express the subject of a document. Usually a compound expression is required, but even when a single word suffices, the same idea may be signified by a number of synonyms, e.g. Frozen soil may also be indexed under Permafrost, with corresponding terms in all the different languages. In a large cumulative index, the number of possible catch-word headings has no limit, and the searcher can never be sure that the possibilities of the index have been exhausted. No bibliography is complete, and the most useful ones are periodical. All must be searched. Frequently it is necessary to go through the whole tiresome process many times. The alphabetical method of indexing makes this search extremely laborious.

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* A system based on the UDC, but with modifications.

Alphabetical arrangement scatters references to related and similar subjects, and it brings together entirely unconnected subjects. Sperm whales find themselves associated with Spermatozoa and Polar Bears with Polar projections. The number of possible arrangements of words that can be selected to express each of the ideas to be indexed is so enormous that it is imperative to use only a carefully chosen selection of subject-headings, with an elaborate proliferation of irritating cross-references. Information on each subject is to be found both in larger conceptions which include that subject, and in smaller groups into which that subject may be subdivided. Moreover, every alphabetical index reflects the personal experience of the author and therefore cannot usefully be cumulated into one.

We want to arrange *ideas*, which are not words and have no alphabetical order. They can only be arranged by a system of classification. The alphabetical arrangement of subject words necessitates reading each index through from beginning to end, in order to find where the references to any particular topic may have been hidden by the indexers. Differences in language and usage render any alphabetical arrangement of subjects unsuitable for international use.

The conclusion is inescapable that a system of classification tied to a numerical notation is essential for any effective subject catalogue of international scope.

The relation between completeness and effectiveness of a subject catalogue must remain a matter of judgment. On practical grounds it takes less time to catalogue and classify an item than to evaluate its probable worth. Hence there is a tendency to preserve and catalogue too much; the average research worker is then discouraged by the wealth of promising documents of which a high proportion turn out, on closer examination, to be unhelpful.

Regional classification

The auxiliary numbers of place in the official UDC schedules are unsuitable for the use of polar specialists, who view the world on polar rather than Mercator's projection, and who also cannot ignore administrative changes which may be reflected both in place-name and boundary changes. The FID allows special numbers for non-UDC regional schemes to be used, provided it is made clear where the full schedule of these special regions can be found. These numbers are placed within round brackets, and are preceded by an asterisk to distinguish them from the standard UDC regional numbers.

Once it had been decided that the existing UDC regions were unsuitable, it was necessary to devise a new regional classification of the polar regions (Roberts, 1950 and 1956). Except in areas with definite physical boundaries e.g. islands), it was found most convenient to classify mainly according to political and administrative regions. However, no classification based on political grouping has long-term validity, and the new schedules were prepared with the knowledge that they would need periodical revision. The principle is accepted that revision of the subdivisions of each major region may become necessary at different dates, and that the treatment of the details of each region may differ with local circumstances. Thus the comparatively small island subdivisions of Svalbard and the sub-Antarctic islands will not change (except, perhaps, in name), but the administrative boundaries of the Soviet Arctic mainland are undergoing frequent modification, and no one can regard the present political subdivisions of Antarctica as permanent.

All matter to be classified topographically is placed under the regional numbers of this special auxiliary schedule. In general, matter is classed under the broadest appropriate heading unless the estimated quantity of documents necessitates further subdivision. Subdivision of each *major* topographical region by subjects is affected by use of the colon and the appropriate UDC number, e.g. (*49) : 639.211 Alaska : Salmon fisheries. Whenever possible, information about particular regions is classed regionally and then subdivided by subject. In some cases, when more than one major region is covered by a single document, it is more convenient to classify by subject only. Whenever appropriate, additional cards are made so that the reference may also be traced from the point of view of subject, e.g., in the above example, 639.211 : (*49) Salmon fisheries : Alaska.

Non-polar countries are classified by the standard UDC auxiliary numbers, which follow in sequence after the asterisk series, e.g. (489) : 551.332.55 Denmark : Eskers.

The problems of subject and regional classification are by no means simple, especially the question of how far it is useful to subdivide major headings when it is necessary to prepare classified references involving reversal of the component parts of compound numbers for both subject and region. The SPRI has prepared a document containing suggestions about the use of the colon and reversal of numbers. This is available on request (SPRI, 1960).

Abstracting services and their use

The aim in the *Polar Record* and *Journal of Glaciology* lists of current literature has been to prepare "indicative" abstracts: very brief and intended to enable the reader to decide whether or not he should read the original publication. Provided an item fulfils this requirement, the shorter it is, and the sooner it is produced, the better. The annotations accompanying these references differ from "informative" abstracts, which are intended to save *most* readers from reading the whole work. For many reasons it would be preferable to issue "informative" abstracts, summarizing the principal arguments and giving the principal data of the original publication. However, considerations of available time and expense at present make this impossible. This "indicative" abstracting service is selective of the publications that seem most significant. "Informative" abstracts are produced, for example, in the bibliographies issued by the Arctic Institute of North America (1953–57), the American Meteorological Society (1950–), and by the Snow, Ice and Permafrost

Research Establishment (1951–59). These are more useful than "indicative" abstracts, but are often not issued until some time after the original publication. The delay in issuing some abstracts is so great that they are of little use for current awareness. The value of abstracts is, of course, ultimately dependent on the author and classification system by which they are arranged and can be traced.

A review of the existing abstracting services relating to polar studies leaves one with the impression that there is already a very wide measure of agreement on the basic requirements; that the time is ripe for discussion of more co-ordinated activity and less duplication of work. Some provisional suggestions are set out in the conclusions to this paper (see p. 14).

Those interested in the use of abstracts appear to desire the following qualities in order: breadth of coverage, speedy publication, technical competence, competent indexing, low cost. In personal interviews most people have indicated a desire for "indicative" rather than "informative" abstracts. However, 80 per cent of physicists in the United States who answered a questionnaire about *Science Abstracts* desired "informative" rather than "indicative" abstracts (Gray, 1950). It is interesting that only 6 per cent of American physicists replying to this enquiry admitted to using abstracts as a substitute for the original paper. The same enquiry indicated that about one in three in the United States used UDC numbers, while the percentage in other countries was much higher.

Expedients adopted in the SPRI library

Much effort has been devoted at the SPRI to acquiring sets of the most relevant periodicals, and lists of those in the library have been made available at intervals (King, 1959). A comprehensive loose-leaf register of periodicals not held in the library is also maintained, with an indication of other libraries where they may be found. This has proved particularly useful in the case of many Russian periodicals, which are otherwise especially difficult to find. It supplements the *British union-catalogue of periodicals* (Stewart, 1955–58), an invaluable work which is used to locate publications classified in the "unchecked catalogue" described below. Similar union lists are also available in many other countries.

The cataloguing of the whole contents of the SPRI library, with cards in author, subject and regional series, is still uncompleted. Pressure of work does not always permit application of the standard rules. When large collections of books or pamphlets are received, it is often only possible to classify them provisionally for physical placing. At the same time a simplified entry on a pink card is filed in the author catalogue. These must suffice until time can be found to make full annotations, added entries, etc., and the usual white cards can be duplicated for the subject catalogue. Some useful hints on "limited" and "simplified" cataloguing have been published by Jolley (1952). It is an expedient which, as Jolley remarks, may well have permanent application for certain classes of material, especially where research is necessary to complete the data (e.g. reprints which do not record the source, or early publications of bibliographic complexity). Policy in these matters must be determined by the steady pressure of accessions and uncatalogued arrears.

With the present growth of literature, no library can afford to regard itself as self-sufficient. When it became evident that, even with increased financial resources, the SPRI could not hope to collect together all the relevant polar publications, we decided to build up a supplementary card catalogue, classified by subject only, of references to works not in our own library, but which could be found elsewhere. This research tool, known as the "unchecked catalogue" because the original publications have not been seen, now contains about 70,000 cards (roughly twice the number in the main library author catalogue). Initially it was constructed by mounting or typing on to cards all the references or abstracts of publications which we could not afford to buy. This proved so useful that it was rapidly expanded by adding references from other sources such as Library of Congress printed cards, booksellers' catalogues, library accession lists, abstracting journals and bibliographies. When sets of the *Zoological Record*, *Meteorological Abstracts and Bibliography* and *World Fisheries Abstracts*—to take three examples—had been combed for relevant entries and incorporated, it was possible to begin to feel some reliance on the efficient coverage of published literature in these fields. Next, we cut up and mounted on cards the items that had not already been incorporated from the standard Antarctic bibliographies prepared by B. Aagaard, J. Denucé, H. R. Mill, J. H. Roscoe and others. We then began to incorporate items from the serial Arctic bibliographies produced by the Arctic Institute of North America (cut up and mounted on cards). This last activity is still unfinished, but it has been a humbling experience to discover what a wide discrepancy in coverage of significant works apparently exists between this major enterprise and our own. The magnitude of the task can be judged from the numbers of abstracts involved. At the time of writing, the *Arctic Bibliography* has published abstracts of 43,464 items, a work of enormous value. SIPRE has in the same period published abstracts of over 18,000 items relating to glaciology. There is a lack of coincidence in selection which causes doubts about adequate coverage by any organization.

A useful aid adopted by some organizations is to issue with the publications themselves several copies of abstracts already printed on cards. This is done, for example, by Expéditions Polaires Françaises and by the Instituto Antártico Argentino. If there is no time to edit these into our particular style in English, it is convenient to be able to add UDC numbers and file the cards in the original French and Spanish, without delay.

The problem of selection is ever present, and has to be applied ruthlessly to the publications which are collected and preserved in the building, especially if they are known to be easily available elsewhere. In our "unchecked catalogue," however, it has been found quicker to classify and incorporate unfamiliar but apparently relevant references than to attempt to evaluate them. Weeding can be done later, whenever someone is interested enough to investigate any particular topic in detail. In this way the cards in the "unchecked catalogue" are slowly being transferred to either the main catalogue or the waste-paper basket. If the advancement of fundamental knowledge was the sole objective, it would be possible to follow a very different policy, succumbing to the temptation to ignore or destroy vast quantities of near-trash. But the information officer must be prepared to produce the documents which in his judgment are most likely to be requested by enquirers.

On the difficult question of selection, we must admit to continued doubts about where the line should be drawn. There is much to be said for the point of view that nearly all the really significant advances in science are made by individuals or teams who have not wasted much effort on the details of past research; that the undoubted repetition of work is unavoidable and in the long run absorbs less effort than finding out what is already known.

The task of preparing, classifying and incorporating many thousands of cards into a catalogue is a formidable one, but once the backlog has been dealt with, it should not be so difficult to keep up-to-date. Anyone familiar with serious academic endeavour knows that the effort expended in the collection, preparation and checking of a reliable bibliography even of modest scope and specialized nature must be measured in man-years.

Nomenclature and place-names

Just as classification is one of the basic aids to polar research, so is nomenclature. Most classification systems are ultimately dependent on keys which take the form of alphabetical indexes of words which guide the searcher to the relevant section of the classification, either from the point of view of region or of subject. Changes in the meaning and use of words are all the time separating what we are trying to bring together.

Classification can only achieve its full contribution to bibliographic organization with improved standardization of nomenclature, and, *of still greater importance*, a greater measure of agreement on conceptual units and their relationships.

During the past 20 years the SPRI has for this reason devoted disproportionate effort to promoting international agreement on some of these barriers to interchange of ideas, for these problems are not amenable to solution by individuals working in isolation. Anyone who looks back over this period cannot fail to be impressed by the changes that have taken place. In 1925 professional polar workers, other than trappers and prospectors, hardly existed outside the Soviet Union. Elsewhere, it has been a period of transition from the spasmodic personal enterprise of relatively few ambitious and highly individual men to the major government-sponsored continuous projects of today, with thousands of men involved, many of them highly qualified in their own specialist fields. It is not surprising, therefore, that this change from amateur to professional activity has been accompanied by the introduction of more discipline into the subject.

The most intractable problem in this connection has proved to be place-names, and here there is still a long way to go before anything like uniform usage can be achieved. In areas where no administrative authority has concerned itself with place-names, they have grown wild and have not been subject even to the discipline of any one language. General recognition of Norwegian sovereignty in Svalbard and Jan Mayen, and of Danish sovereignty in Greenland, removed the last doubts about the responsible authorities for all regions in the Arctic. Each authority has since given attention to systematic mapping and the problems of stabilising the names in their own areas. In 1941 United

Kingdom government departments agreed that, in all official documents relating to countries which use the Roman alphabet, English conventional names would no longer be used; the general principle was adopted that, with specified exceptions, the orthography on the official maps or charts of each recognized administrative authority would be adopted. A most useful statement of principles was published by the Secretary of the Permanent Committee on Geographical Names for British Official Use (PCGN) (Aurousseau, 1942). A major advance towards international agreement on this subject in the English-speaking world was achieved at a joint conference of the PCGN and the United States Board on Geographic Names (USBGN) held in London in October 1947. The principles then adopted have since been elaborated (Permanent Committee on Geographical Names, 1954) and widely applied in the official documents of British Commonwealth countries and the United States. They enormously simplified the task of classifying and exchanging polar information. For this reason, they have also gained wide support from editors and authors who are not bound by the international agreements. These principles, however, left unresolved the problems of transliteration from non-Roman alphabets (see below), and they could not be applied consistently by everyone to the Antarctic because the United States and Soviet Union, for example, have not recognized any sovereignty in the area and there also exist overlapping claims by other nations.

Antarctic place-names have thus provided a problem of special complexity owing to the continued political disputes about sovereignty. A wide measure of agreement has, however, been achieved by informal discussion between some of the national committees responsible for recommending names. The work of reconciling conflicting names continues.

Names are a nuisance but a very necessary nuisance. The mere giving of new place-names can only rarely be regarded as a serious contribution to knowledge. So long as a very large number, and possibly a majority, of these named features remain imperfectly known and defined, the most urgent task confronting Antarctic surveyors and cartographers is not that of adding to the number of names but that of revising and putting in order the names that are supposed to be already "known".

Transliteration

The use of different systems of transliteration from non-Roman alphabets is another cause of confusion in the rapid tracing of information. In the polar regions this affects especially the Soviet Arctic, Iceland, and, more recently, Russian work in the Antarctic.

The need for a consistent transliteration system arises chiefly in bibliography for the names of authors, and for place-names. For Russian, a compromise has to be made between (*a*) a letter-for-letter substitution, which produces words that in English are clumsy and difficult to pronounce, and which also requires the use of diacritical marks; and (*b*) a sound-for-sound substitution, which is apt to be inconsistent and makes transliteration back into the original very difficult. A system is required which produces words that a reasonably intelligent English speaker, observing a few simple conventions, will be able to pronounce in a way that will be recognizable to a reasonably intelligent Russian. It is also important that someone who knows no Russian should be able to transliterate words back into Russian with sufficient accuracy to identify the same place on a Russian map, or the same work in a bibliography.

This is not the place to argue the relative merits of the different systems, of which a dozen or so are now established in British and American use. It is enough to explain that the SPRI adopted the system recommended by the Permanent Committee on Geographical Names (1942); primarily because this was used by the War Office and Admiralty for official maps and charts. At the joint conference of the United States Board on Geographic Names and the Permanent Committee on Geographical Names held in London in 1947 it was agreed that a development of the PCGN system should be jointly recommended. This was known as the USBGN 1944 system (see reference Permanent Committee on Geographical Names, 1948). It admittedly had some unsightly results, such as the endings *-yy* and *-iy*, which only make pronunciation more difficult, but the ease with which persons ignorant of Russian can use the system is an advantage. Despite the inconvenience of a change, the SPRI adopted it in 1949 because it seemed to be the only system for which there was any prospect of unanimity among English-speaking organizations (even so, it was necessary to make one exception on grounds of expediency : Bellingshausen Sea, not Bellinsgauzen Sea!).

In 1953 the Royal Society recommended a new system (Royal Society, 1953), designed mainly for bibliographical use. Its special merit is that it allows back-transliteration into Russian by those who do not know the language. No other existing system will do this; but it is unsuited to cartography.

Adoption of the system now used by the SPRI is influenced primarily by the United States–United Kingdom agreement of 1947, since that is the system which has since been used in all official maps and charts issued by both countries. It is also used by Australia and New Zealand in the Antarctic. The consideration that names can be found on up-to-date charts, sailing directions etc., must prevail, and it is not considered practical to use one system for place-names and another for personal names, titles etc.

The *Arctic Bibliography* and SIPRE *Bibliography on snow, ice and permafrost*, for example (both of which are prepared in the Library of Congress), use the Library of Congress system for transliterating cyrillic characters of authors' names and the titles of their works. They write Nikolaĭ Evgenov and Iamal, while the SPRI writes Nikolay Yevgenov and Yamal. Authors may thus be indexed in different places. Place-names, however, are indexed in the *Arctic Bibliography* under their spelling according to the USBGN 1944 system in order to conform with official American maps and charts. Place-names therefore appear in two different transliterations in this major work. Almost every bibliography exhibits other variations. Any system of transliteration, once established in a big library, cannot be changed without great expense, delay and confusion. There is therefore no easy solution.

The problems of transliteration of Icelandic are less serious, but there is still no general agreement, even in the English-speaking world, on the best way to render the letters þ and ð. The SPRI has consistently advocated that these two Icelandic letters should not be transliterated.

Abbreviations

Another problem which must now be facing all editors of scientific journals and certainly most readers is that of abbreviations. Obviously some are essential, but the devising of obscure abbreviations seems to have developed into a cult. Often the straightforward full word is all that is needed.

Letters representing expedition titles are an old tradition. Polar history is full of them, especially in the last thirty years. Authors seem to forget that there were other expeditions besides the one or two in which they themselves participated, and that as time passes the interpretation does not jump to the mind of every reader, even when the dates are added! These abbreviations are often inevitable, but let us make things as easy as possible for our successors by at least sticking rigidly to the initial letters of the official title of each expedition, in its own language, and avoiding unexplained abbreviations whenever possible.

On many of the labels in museums, and hence in publications, these letters and the date provide the only clue to the expedition which collected the specimen. This in turn may be the only means of determining some other details which the collector omitted. Many reports do not give full titles. If we are lucky, they may include a date, thus: A.N.A.R.E., 1950; F.I.D.S., 1946–47; B.A.E., 1910–13; S.G.S., 1955–56; B.G.L.E., 1934–37; J.I.R.P., 1948; B.A.N.Z.A.R.E., 1929–31; O.U.A.E., 1935–36; B.A.A.R.E., 1930–31; A.A.E., 1911–14. These are well-known examples. But there are hundreds of them, increasing every year. All of them were familiar to their originators, but how many readers of this paper can now identify them all? British expeditions have been much the worst offenders in this respect.

Far preferable are code names for operations, exercises or projects like "Edelweiss II", 1944; "Musk-Ox", 1946; "Highjump", 1946–47; or "Deep Freeze 60". There is no temptation to abbreviate these. But for indexing purposes, let us avoid translating these code names into our own languages, e.g. in Spanish Operación "Deep Freeze II", *not* Operación "Congelamiento II".

This plea has special interest for those who have had to waste hours (as we often do at the SPRI), hunting for references like "B.A.E. Repts, 1926,3." There is no author. Which expedition? Was it British or Belgian? Was it Arctic or Antarctic? Was 1926 the date of the expedition or of the publication of the report? Is it Vol. 3, Part 3, or page 3?

The Future of polar documentation

In the course of this work we have learnt that some things need to be done and that other things are impractical or unnecessary. A large number of people who are interested in polar research do not want information badly enough to make any thorough search. They are prepared to go to a shelf and pull down a few volumes and turn over the pages, but not much more. What was initially suspected—and is in fact now known to the writer—is that very few of the references really required for any particular investigation are actually used in its preparation, although they may appear in the list of references at the end of the publication if the author is sufficiently conscientious. The fact is that the proportion of published information that is of real value or reliability is very low, and this is a heavily discouraging factor. The number of publications that can be consulted is strictly limited for most people. A few publications may be examined repeatedly, but most perish in the files unseen. The solution here seems to lie more in the hands of editors than librarians or information services. As Professor Bernal and others have often emphasized, a *rational publication and information service policy is one which will result in the users paying more and receiving less.*

The plethora of publications is itself a serious limitation to the circulation of information, since the quantity is far greater than anyone can read in his own field. These comments should not obscure the conclusion that personal contacts must remain the chief means of gaining information.

A broad review of existing polar literature raises a few outstanding impressions. The chief of these is the need for more careful planning of field work. Too many observations and measurements have been accumulated without sufficient thought for the purpose they can serve in forwarding the solution of specified problems. One of the achievements of the International Geophysical Year has been full realization of this defect. A great effort has been made to avoid the accumulation of uninstructive material.

The organization of World Data Centres by the IGY is particularly important for polar workers on subjects such as meteorology, geomagnetism, aurora, cosmic rays, atmospheric nuclear radiation, the ionosphere and other synoptic fields. World Data Centres are less likely to be effective in non-synoptic fields such as glaciology and oceanography.

There is really no delight in the headlong accumulation of facts. But there is intellectual satisfaction to be gained from selection, arrangement and synthesis. The work of assimilation and digestion is less dramatic and more difficult to finance, and for this reason it is failing to keep abreast of the field work.

More thought could usefully be given to the titles of papers so that they express concisely and exactly the contents. Editors ought to have more understanding of the mechanics of documentation and of the need for organizing subject-matter into suitable form. Each new contribution should deal with a specific subject or group of related subjects which should be clearly indicated in the title. It should not normally be necessary for a specialist to read right through a work in his own field and still wonder anxiously what it is really about, or how it can be classified so that the subjects covered can be found again if required.

Conclusions

Despite the very rapid increase in polar activities during the past two decades, the systematic international interchange of publications and information about the polar regions appears to have been working well. There are, however, certain aspects in which closer co-operation is both desirable and possible. The main points for discussion may be summarized as follows:

(1) Bi-lateral arrangements between individual organizations to exchange publications can be extended, especially in the form of reprints from periodicals which may otherwise be difficult to obtain. The most important original documents should be available for consultation at the main centres.

(2) There are serious practical difficulties which prevent centralized organizations from collecting and distributing documents which they have not themselves sponsored. The best solution therefore seems to lie in the exchange of bibliographic information. It would go far to meet the situation if the chief organizations could agree to exchange cards relating to the most significant works produced in their own countries. These cards would be used first as a check on what original documents each organization may wish to acquire. They would then be cumulated by each organization in author and/or subject card catalogues, which could be kept continuously up-to-date.

(3) The minimum requirement for such an exchange is agreement on a standard size of card. It is possible to cumulate such cards regardless of their language, style and content, but the greater the variety of format, the greater the labour of classifying, filing and use. The amount of editing required may make it preferable to redraft a card completely; and when more than one author or subject is involved it may in any event be necessary for each organization to make additional copies.

(4) The ideal would be to exchange the necessary number of cards for each reference; all in approximately the same format, already classified by an agreed system, and ready for filing without further specialized labour. The notable progress towards this aim already achieved between a number of organizations having polar interests encourages the belief that this is both practical and useful.

(5) It is suggested that there is need for the exchange of two different kinds of reference card, described in this paper as "indicative" and "informative" abstracts (see p. 7). The former should be produced and distributed quickly in small batches at, say, monthly intervals, but the latter take longer to prepare and can follow later as a more permanent record. In both cases they can usefully be circulated in two forms: (*a*) individual cards issued as soon as they are available, and (*b*) published bibliographies which are likely to be more selective and may either be incorporated in each issue of a periodical (e.g. the *Polar Record*), or large bibliographies (e.g. the *Arctic Bibliography*). The printed cards and volumes of bibliography issued by SIPRE are admirable examples which meet all practical requirements.

(6) Consideration needs to be given to the possibilities of wider agreement on:

(*a*) the style of catalogue entries and the details which they should include in the categories suggested above,

(*b*) the use of an agreed classification system or systems,

(*c*) the adoption of a common policy for place-names,

(*d*) the problems resulting from different systems of transliteration from non-Roman alphabets.

(7) There is a strong case for diverting a small proportion of the financial resources at present applied to field work to assist in the assimilation and digestion of results at home, and to defray the cost of increased international interchange of information.

Acknowledgements

It is impossible to mention by name all those whose co-operation has built up the existing facilities at the SPRI. The original idea of a centre for polar information and research was due to Professor Frank Debenham, the founder and first Director of the Institute. As his idea grew, many others became involved. The collections expanded rapidly. A considerable debt is owed to the late Dr. S. C. Bradford of the Science Museum Library, who provided the stimulus and guidance that enabled us to gain control of the spate of documents which have often threatened to defeat all our aims. In succession to Dr. Bradford, the British Standards Institution has provided invaluable guidance through Mr. G. A. Lloyd and his associates.

Professor Debenham's successors, Dr. W. L. S. Fleming (now Bishop of Norwich), Dr. G. C. L. Bertram, and Dr. G. de Q. Robin, have all fostered these original objectives. I would like to record a word of thanks to the staff of the SPRI, and to many voluntary helpers who have freely given their time to further the objectives outlined in this paper. Special acknowledgement is due to Miss Doris Johnson (librarian of the Institute from 1946 to 1951), H. King (librarian since 1955), Miss Ena Thomas (my asistant since 1947), and Dr. J. W. Glen (of the British Glaciological Society).

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